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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/813,509

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David Clarence Mullen

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EXAMINER

NGUYEN, KHAI N

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/813,509	Applicant(s) MULLEN, DAVID CLARENCE	
	Examiner Khai N. Nguyen	Art Unit 2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on March 29, 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on March 29, 2004 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
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| <p>1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)</p> <p>2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)</p> <p>3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date <u>March 29, 2004</u>.</p> | <p>4) <input type="checkbox"/> Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____</p> <p>5) <input type="checkbox"/> Notice of Informal Patent Application</p> <p>6) <input type="checkbox"/> Other: _____</p> |
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DETAILED ACTION

Title

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Method and apparatus to forecast the availability of the Call Center agent for servicing calls.

Claim Objections

1. Claim 1 is objected to because of the following informalities: Claim 1 apparently attempts to claim an apparatus "A computational component", but there is no indication in the body of claim 1 that any of structural elements of an apparatus referring back to the preamble are claimed. It appears that claim 1 in fact claims a method, which is performed by a computational component. Claims 2-14 (dependent claims of claim 1) are method claims, i.e. belong to different statutory category than claim 1. Appropriate correction is required.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-13 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims 1-13 are appeared to be claimed an algorithm or a program code, and therefore these claims did not fall within at least one

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of the four enumerated categories of patentable subject matter recited in section 101 (i.e., process, machine, manufacture, or composition of matter).

Claim 14 rectifies and confirms this algorithm by claimed that the algorithm is performed by a logic circuit.

As per claim 13, it is not clear if a program code claimed is necessarily in executable form, i.e. that it is not a non-functional descriptive material. Whether functional or non-functional, claim 13 fails to claim that the program is recorded on an appropriate computer readable medium so as to be structurally and functionally interrelated to the medium and permit the function of the descriptive material to be realized. It is not clear that a computer readable medium when operate on a computer would perform the method.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-6, 9-12, and 14-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Cave (U.S. Patent No. 5,327,490).

Regarding claim 1 Cave teaches a computational component for performing a method, the method comprising:

selecting a forecast horizon (Fig. 1, column 2, lines 27-31, i.e. gathers statistics about call times and agent talk times to forecast agent availability for a next call);

determining a first probability related to an availability of at least a first resource within said forecast horizon (Fig. 2 – L1, 204 and L2, 214, column 5 lines 1-4, i.e. an agent is connected to a called party – first probability “talk state”);

determining a second probability related to said availability of said at least a first resource within said forecast horizon, wherein said first and second probabilities are different from one another (Fig. 2 – L1, 204 and L2, 214, column 5 lines 1-4, i.e. wrap-up time - second probability “wrap-up state”);

combining said determined first probability and said determined second probability (Fig. 2 – L1, AAIUT, column 5 lines 1-4, i.e. AAIUT is a combination of “talk state” and “wrap-up state”); and

normalizing a result of said combining said determined first and second probabilities to obtain a probability of arrival within said selected forecast horizon to obtain a first forecast (Fig. 3C-3D, column 5, lines 10-13, i.e. to predict when each agent will be available next).

Regarding claim 2 Cave teaches a method wherein said first resource comprises a first agent, wherein said first probability comprises a probability that said first agent will complete a talk state within said selected horizon, said first probability derived from a time said agent has been in said talk state and a probability distribution for agent time

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in said talk state (Fig. 2 – L1- 204, L2 - 214, AAIUT, column 5 lines 14-16, i.e. AAIUT comprises “talk state” probability distribution);

and wherein said second probability comprises a probability that said first agent will complete a wrap-up state within said selected time horizon, said second probability derived from a probability distribution for agent time in said wrap-up state (Fig. 2 – L1 – 204, L2 - 214, AAIUT, column 5 lines 14-16, i.e. AAIUT comprises “wrap-up state” probability distribution).

Regarding claim 3 Cave teaches a method wherein said first probability is determined for an actual time said at least a first agent has been in said talk state, and wherein said second probability is determined for zero time in said wrap-up state (Fig. 3C-3D – column 6, lines 23-25, column 5, lines 1-4, i.e. includes any wrap-up time (zero time or more)).

Regarding claim 4 Cave teaches a method wherein said first resource comprises a first agent, wherein said first probability comprises a combination of a probability that said first agent will complete a talk state within said selected forecast horizon and a probability that said first agent will complete a wrap-up state within said selected forecast horizon, and wherein said second probability comprises a probability that said at least a first agent will complete a total handle time state within said selected forecast horizon (Fig. 3C-3D, L1 – T1 to T3, column 6, lines 47-52, i.e. AAIUT includes “talk

state”, “wrap-up state” and agent #1 completes the call and goes on-hook “total handle time state”).

Regarding claims 5 and 6, Cave teaches a method wherein said combining comprises adding said first and second probabilities; and calculating a product of said determined first probability and said determined second probability, and wherein said normalizing comprises dividing said product by two (Fig. 2, column 5, lines 1-16, i.e. statistical computation).

Regarding claims 9 and 10, Cave teaches a method wherein a probability of arrival is calculated for a plurality of resources; and wherein said probabilities of arrival for each of said plurality of resources are combined to obtain said first forecast (Fig. 1 – i.e. shows a three agent system, column 3, lines 28-34, column 5, lines 8-10).

Regarding claim 11, Cave teaches a method wherein said selected forecast horizon comprises a forecast time until an outbound call is completed to a live person (Fig. 2 – 203, a live person comes on line, column 6, lines 42-43, column 6, lines 47-52).

Regarding claim 12, Cave teaches a method further comprising using said first forecast to determine whether or not to place an outgoing call (column 2, lines 43-49, i.e. TSC –time to start calling).

Regarding claim 14, Cave teaches a method wherein said computational component comprise a logic circuit (Fig. 5 – 57 – i.e. call control computer, column 4, lines 64-66).

Regarding claim 15, Cave teaches a method for forecasting arrivals of agents, comprising:

selecting a forecast horizon (Fig. 1, column 2, lines 27-31, i.e. gathers statistics about call times and agent talk times to forecast agent availability for a next call);

forecasting the number of agents available within said selected horizon, said forecasting including:

determining a probability of completion of talk state for each of a plurality of agents (Fig. 2 – L1, 204 and L2, 214, column 5 lines 1-4, i.e. an agent is connected to a called party – “talk state”);

determining a probability of completion of wrap-up state for each of said plurality of agents assuming each is at the start of wrap-up (Fig. 2 – L1, 204 and L2, 214, column 5 lines 1-4, i.e. wrap-up time - “wrap-up state”);

combining said determined probability of completion of talk state and said determined probability of completion of wrap-up state to obtain an agent arrival probability for each of said plurality of agents within said forecast horizon (Fig. 2 – L1,

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AAIUT, column 5 lines 1-4, i.e. AAIUT is a combination of “talk state” and “wrap-up state”); and

combining said agent arrival probabilities for each of said plurality of agents to obtain a first forecast (Fig. 3C-3D, column 5, lines 10-13, i.e. combining AAIUT to obtain a forecast, and column 8, lines 6-7, single AAIUT for all agents).

Regarding claim 16, Cave teaches a method wherein said combining said agent arrival probabilities for each of said plurality of agents to obtain a first forecast comprises:

aggregating a supply of agents as a sum of probabilities of arrival of each individual agent included in said supply of agents (Fig. 3A-3D – column 10, lines 8-10).

Regarding claim 17, Cave teaches a method further comprising initiating an outbound call when said first forecast indicates an excess supply of agents (column 10, lines 11-15, i.e. capability of changing the number of outbound calls).

Regarding claim 18, Cave teaches a method wherein said forecast horizon is selected from one of a time corresponding to said predicted time to a live disposition on outbound calls, an amount of time an agent is predicted to be occupied by work having a lower priority than a priority of work comprising servicing an outbound call, and an amount of time required to recall an agent from lower priority work to work comprising

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servicing an outbound call (column 4, lines 67-68, column 5, lines 1-4, i.e. AAIUT average agent in-use time).

Regarding claim 19, Cave teaches a method wherein said first forecast is provided as an input to a predictive dialer (Fig. 1, i.e. predictive calling (dialing) algorithm, column 7, lines 56-68, i.e. AAIUT parameter is used as an input).

Regarding claim 20, Cave teaches a work distribution system, comprising:
means for predicting a time to a next work item requiring an agent (Fig.1 - 100, and Fig. 5 -57 – column 7, lines 50-52, i.e. predictive calling algorithm (100) employed within call control computer (57));

means for accessing a first agent work segment statistic (Fig.1 – 140, column 7, lines 65-68, i.e. statistics gathering task);

means for accessing a second agent work segment statistic (Fig. 1 – 140, column 7, lines 65-68, i.e. statistics gathering task);

means for determining a first probability of completing said first agent work segment within said predicted time at an elapsed time in said first work segment (Fig.3C – AGENT 1);

means for determining a second probability of completing said second agent work segment within said predicted time at zero elapsed time in said second work segment (Fig.3D – AGENT 2); and

means for combining said first and second probabilities to obtain an agent arrival probability within said predicted time (column 8, lines 6-7, single average agent in-use time for all agents).

Regarding claim 21, Cave teaches a work distribution system further comprising means for combining agent arrival probabilities for each of a plurality of agents to obtain said agent arrival probability within said predicted time (column 8, lines 6-7, single average agent in-use time for all agents).

Regarding claim 22, Cave teaches a work distribution system further comprising:
means for accessing a third agent work segment statistic, said third agent work segment spanning said first and second work segments (Fig.1 – 103 AGENT # 3); and
means for determining a third probability of completing said third agent work segment within said predicted time at an elapsed time in said third work segment, wherein said means for combining comprises means for combining said first, second and third probabilities to obtain an agent arrival probability within said predicted time (column 8, lines 6-7, single average agent in-use time for all agents).

Regarding claim 23, Cave teaches a work distribution system further comprising means for placing outbound calls, wherein said agent arrival probability is provided as an input to said means for placing outbound calls (column 10, lines 11-15, i.e. outbound calls as a function of average agent in-use time).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7-8, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cave (U.S. Patent 5,327,490) as applied to claims 1-2 above, in view of Cave et al. (U.S. Patent No. 5,570,419) and further in view of Mullen (U.S. Pub. No. 2003/0018762 A1).

Claim 7 - The method of Claim 2, further comprising:

computing a third probability, said third probability comprising a probability that said first agent will arrive within said selected horizon, said probability derived from a time said agent has already spent handling said task and a probability distribution for total agent handle time, wherein said third probability comprises a second forecast;

computing a first variance in agent time in talk state;

computing a second variance in agent time in wrap-up state;

computing a third variance in total agent handle time; and

computing a first ratio, said first ratio comprising a ratio of the third variance to the sum of the first, second and third variances, wherein a measure of the predictability of using talk and wrap-up time statistics relative to using total handle time statistics is obtained.

Claim 8 - The method of Claim 7, further comprising:

determining an a priori probability of completion of said talk state before an amount of time equal to an amount of time said first agent has been in said talk state has elapsed;

computing a product of said a priori probability and said first ratio to obtain a first weight;

computing a product of said first weight and said first forecast to obtain a first weighted forecast;

subtracting said first weight from one to obtain a second weight;

computing a product of said second weight and said second forecast to obtain a second weighted forecast; and

computing a composite forecast by computing a sum of said first weighted forecast and said second weighted forecast.

Regarding claims 7-8, Cave discloses everything claimed as applied above (see claim 1, and 2). However, Cave fails to include the detail to compute the variances, a priori probability and the weighted forecasts. Although Cave has described in detail the predictor gathers statistics (Fig. 6, column 2, lines 28-32, column 7, lines 65-68) and the computation of pertinent statistical parameters (Fig. 3A-3D, column 5, lines 60-67).

In the same field of endeavor, Cave et al. teach a method of using weighted forecasts (Cave et al., column 5, lines 55-67, i.e. highest weight to the most recent...), the variances computation (Cave et al., column 6, lines 1-50), and in addition Mullen teaches a forecaster to compute variances and a priori probability of completion of

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servicing the call within the selected forecast horizon (Mullen, Fig. 1 – 122, Fig. 2 – 214, paragraph [0020], paragraph [0057]-[0058]). The advantage of Cave et al. is allow a supervisor to set a target value for agent utilization (Cave et al., column 1, lines 65-67, column 2, lines 1-17), and the advantage of Mullen method is to avoid annoying call recipients (live answer – agent was not available) with outbound calls (Mullen, paragraph [0061]).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide Cave with the detail computation of variances, a priori probability and weighted forecasts.

Claim 13 - The method of Claim 1, wherein said computational component comprises a computer readable storage medium containing instructions for performing the method.

Regarding claim 13, Cave discloses everything claimed as applied above (see claim 1). However, Cave fails to specifically disclose their invention is readily implementable as one or more computer-readable signal-bearing media. Although, Cave has described in the detail that include a computer and a call control computer, these computers perform the method of predictive dialing (Cave, Fig. 5 – 51 and 57, column 4, lines 1-66).

In the same field of endeavor, Mullen discloses an apparatus and a work-management method to determine a probability of availability at a future point in time of a plurality of resources (Mullen, paragraph [0007]). The advantage of Mullen's invention

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is the computer readable medium containing instructions which, when executed in a computer, cause the computer to perform the method steps (Mullen, paragraph [0011]). Therefore, it would have been obvious to person of ordinary skill in the art at the time the invention was made to provide Cave with an article, comprising: one or more computer-readable signal-bearing media to implement the method or process steps for forecasting the availability of agents to service calls.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Crockett et al. (U.S. Patent No. 4,829,563) teach a method and an apparatus for predictive dialing.

David (U.S. Patent No. 5,640,445) teaches a call pacing method in which agent availability and call answers are based on probability statistics and the allowable maximum abandon rate.

Szlam et al. (U.S. Patent 5,214,688) teach a method for optimizing the pacing and processing of inbound and outbound calls.

David (U.S. Patent No. 5,926,528) teaches a call pacing method in which agent availability and call answers are based on probability statistics and the allowable maximum abandon rate.

Tonisson (U.S. Patent No. 5,903,641) teaches call center assignments based on agent's skills.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khai N. Nguyen whose telephone number is (571) 270-3141. The examiner can normally be reached on Monday - Thursday 6:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on (571) 272-7687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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KNN
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